



HONOLULU

LA JOLLA

TIBURON

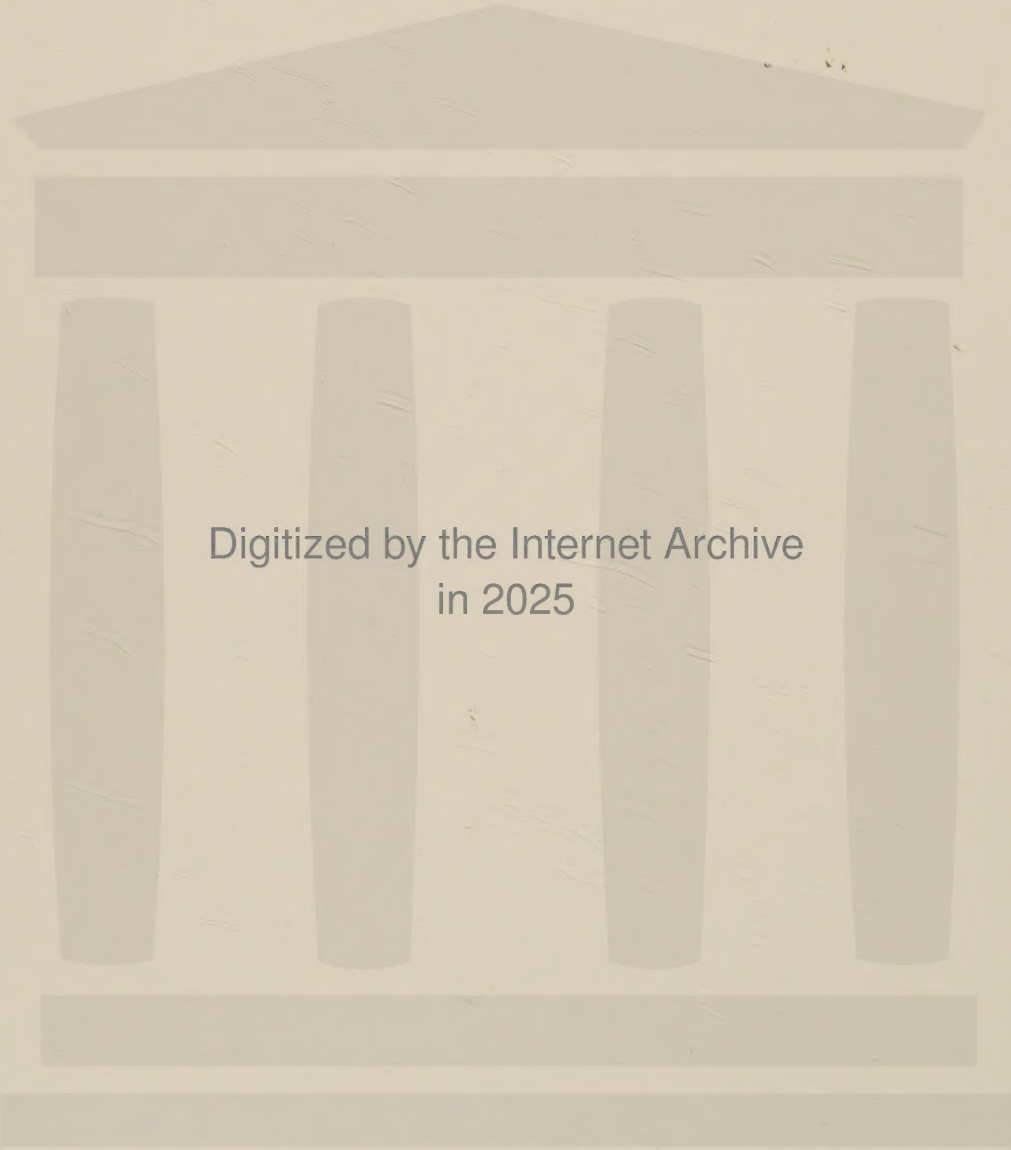


SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - OCTOBER 1976

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PACIFIC ENVIRONMENTAL GROUP

MONTHLY REPORT - OCTOBER 1976

Silver Medal Awards Presented to Tiburon Laboratory
Scientists by Secretary of Commerce

At ceremonies in Washington, D.C. October 28, Commerce Secretary Elliot L. Richardson presented Silver Medals, the Department's second highest honor, to Dr. Edmund S. Hobson, Jr. and Mr. Susumu Kato, Fishery Biologists at the Southwest Fisheries Center's Tiburon Laboratory.

Dr. Hobson was honored for his outstanding contribution to science by pioneering in-depth studies of the ecology of communities of coastal marine fishes.

The citation accompanying the Silver Medal noted that Dr. Hobson's studies are invaluable tools for predicting the effects of environmental modification or the effects of overfishing, and in forming a basis for a sound theoretical approach to the interactions between species and their impact on the habitat.

"Your presentation of this research," the citation states, "in a form that is easily understandable has helped the general public approach the problems associated with unnatural environmental modification."

Acclaimed nationally and internationally by his peers as an outstanding fish behaviorist, ecologist, and nature photographer, Dr. Hobson has published many professional papers that have received wide praise in this country and abroad.

Born in White Plains, N.Y., Dr. Hobson received his B.A. in 1958 and M.S. in 1961 at the University of Hawaii, and his Ph.D. in 1967 at the University of California at Los Angeles.

Dr. Hobson entered the Federal service in 1962 after teaching at UCLA.

This report does not constitute publication and is for information only.

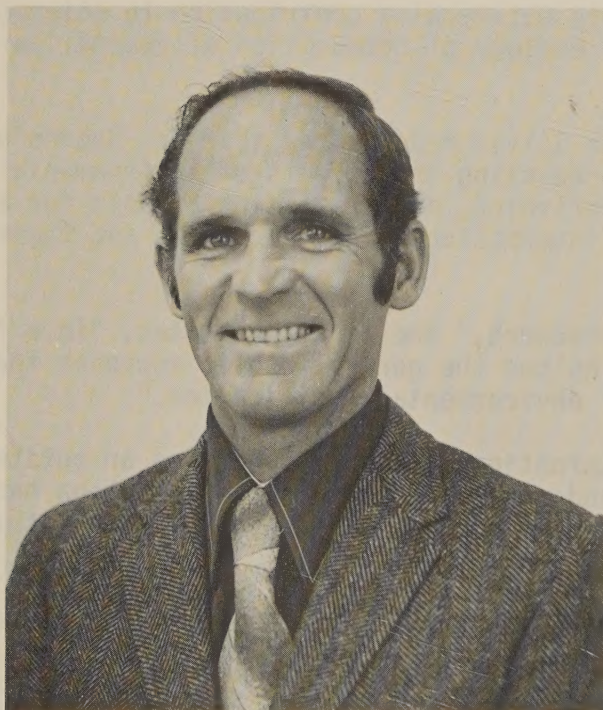
Mr. Kato was recognized for his efforts as the prime mover and catalyst in the development of new and underutilized fisheries in California.

The citation presented with the Silver Medal credits Mr. Kato for successfully seeking ways to upgrade small fisheries, identifying new or minimally exploited resources, expanding markets for unused species of the California Current and adjacent waters, determining and developing market potentials for products, and advising vessel owners and fishermen on catching methods, availability, distribution and handling.

"His dedication and devotion," the citation states, "to the goals of increased earnings for individual fishermen and increased local production of fishery products are in the best traditions of the National Marine Fisheries Service."

It was largely through Mr. Kato's efforts that California sea urchin landings increased from zero in 1970 to 200 pounds in 1971 and to 7.3 million pounds in 1975 with 10 firms from San Diego to San Francisco processing roe for export.

Born in Waipahu, Oahu, Hawaii, Mr. Kato earned the Phi Beta Kappa Key in 1958, his B.A. in 1959, and M.S. in 1962 at the University of Hawaii. He entered the Federal service in 1961.



Edmund S. Hobson, Jr.



Susumu Kato

NMFS Reorganization Results in Addition of
Pacific Environmental Group to Center

As part of the reorganization of the National Marine Fisheries Service undertaken in response to the expanded responsibilities of NMFS under the Fishery Conservation and Management Act of 1976, the NMFS Pacific Environmental Group (PEG) at Monterey, California became a part of the Southwest Fisheries Center, effective October 10, 1976.

At present the group is composed of 10 people in Monterey and 2 people stationed in Tiburon. The mission of the group is to provide environmental information under the NMFS MARMAP program in support of biological and fishery programs at the NMFS Fisheries Centers. PEG's programs fall into two categories: 1) Ocean Climatology and Monitoring and 2) Ocean Modeling and Forecasting. Emphasis is placed on large-scale events and ocean variability going back several decades.

The Ocean Climatology and Monitoring Program assembles environmental data and develops maps, time series, and other summaries of interest to NMFS. Much of this work is in support of the MARMAP "Status of the Environment" report. Data are assembled from various sources including Fleet Numerical Weather Central, National Oceanographic Data Center, other data centers, and from ships of opportunity.

Personnel stationed at the Tiburon Laboratory coordinate the collection of SBT and other data from ships of opportunity.

The Ocean Modeling and Forecasting Program develops indices of ocean flow characteristics from meteorological and oceanographic data and conducts research on the effects of air/sea interactions on ocean conditions. The objective is to gain an understanding of the causes of seasonal and non-seasonal variations in the ocean that affect fisheries and to develop methods of predicting such variations.

STATUS OF PUBLICATIONS

Published

Arthur, David K. 1976. Food and feeding of larvae of three fishes occurring in the California Current, Sardinops sagax, Engraulis mordax, and Trachurus symmetricus. Fish. Bull., U.S. 74(3): 517-530.

The size, number, and types of food particles eaten by larvae of Pacific sardine, Sardinops sagax; northern anchovy, Engraulis mordax; and jack mackerel, Trachurus symmetricus, were determined

by an examination of gut contents of larvae captured in plankton samples from the California Current. Food particles found in larvae of the three fishes were predominantly the eggs, nauplii, and the copepodid stages of the smaller species of copepods. These increased in width as the larvae grew though not so uniformly for the anchovy as for sardine and jack mackerel. Particles ingested by anchovies at first feeding were slightly larger than were those ingested by sardines, while jack mackerel could eat particles three times wider than sardines of equal length. Feeding incidence of sardine and anchovy declined during the early larval period while that of jack mackerel increased. Sardine and anchovy larvae fed only during the day. The data were not analyzed for day-night feeding for jack mackerel.

The relative body depth and relative weight of laboratory-grown anchovy larvae increased throughout the larval periods examined, whereas, the relative body depth of most ocean-caught anchovy larvae decreased during the first half of this period, possibly as a result of the poorer ration obtainable in the ocean. The decline in relative body depth of ocean-caught anchovy larvae may be related to the decline in feeding incidence and to the apparent lack of increase in size of the food particles ingested.

Korn, S., J.W. Struhsaker, and P. Benville. 1976. Effects of benzene on growth, fat content, and caloric content of striped bass, Morone saxatilis. Fish. Bull., U.S. 74(3): 694-698.

The effect of benzene on the growth, fat content and caloric content of striped bass (Morone saxatilis) was determined. Juvenile striped bass were exposed to sublethal concentrations of benzene (3.5 $\mu\text{l/l}$, 6.0 $\mu\text{l/l}$ and control) during a 30-day period, using a continuous flow device. Fish were fed a ration daily (3% body weight). Samples were taken weekly for wet weight, dry weight, fat content and caloric content. There was a significant ($P < 0.05$ analysis of variance) decrease in wet weight, dry weight and fat content with increasing concentrations. No effect on caloric content was noted. The effect on wet weight, dry weight and fat content was probably due to impaired ability to locate food at the higher concentrations.

Laurs, R. Michael, William H. Lenarz and Robert N. Nishimoto. 1976. Estimates of rates of tag shedding by North Pacific albacore, Thunnus alalunga. Fish. Bull., U.S. 74(3): 675-678.

A tagging program was begun in 1971, and is continuing, on North Pacific albacore, to examine their migration patterns, to obtain information for use in population studies, and to estimate rates of mortality. Because loss of tags through shedding can cause estimates of mortality to be biased upwards unless corrected for, part of the tagging program in 1972 consisted of an experiment in which 788

albacore were double-tagged to evaluate tag shedding by this species. Immediate (Type I) and Instantaneous (Type II) rates of tag shedding were estimated using data from a double-tagging experiment. Type I shedding was estimated to be about 0.12 and Type II to be between 0.086 and 0.098 on an annual basis. The paper also contains a discussion on the accuracy of the estimates, and a method was developed to estimate possible bias due to fishermen reporting double tag recoveries as single tag recoveries. The possible bias was estimated to be low.

Sakagawa, Gary T., Atilio L. Coan, and Eugene P. Holzapfel. 1976. Length composition of yellowfin, skipjack, and bigeye tunas caught in the eastern tropical Atlantic by American purse seiners. NOAA Tech. Rep. NMFS SSRF-702, 22 p.

Sampling and analytical procedures that are used to estimate the size composition of Atlantic tunas caught by American purse seiners in the eastern tropical Atlantic are described. The procedures are based on a stratified, two-stage subsampling model. Estimates indicated that about 0.2 to 1.4 million yellowfin tuna, Thunnus albacares, 1.2 to 12.8 million skipjack tuna, Katsuwonus pelamis, and 0.5 to 41.2 thousand bigeye tuna, T. obesus, were caught annually by the fleet in 1968-74. The dominant age group in most years was 1-yr olds for yellowfin and skipjack tuna and 2-yr olds for bigeye tuna.

Zweifel, James R. and Reuben Lasker. 1976. Prehatch and posthatch growth of fishes--A general model. Fish. Bull., U.S. 74(3): 609-621.

The developmental stages of fish eggs and the growth of larval fishes of several species can be represented by a Gompertz-type curve based on the observation that in widely different living systems, exponential growth tends to undergo exponential decay with time. Further experimental studies and field observations have shown that the effect of temperature on the growth process follows the same pattern, i.e., the rate of growth declines exponentially with increasing temperature. Evidence suggests that prehatch growth rates determine ideal or optimum trajectories which are maintained after hatch in the middle temperature range but not at either extreme. Also, posthatch growth exhibits a temperature optimum which is not apparent in the incubation period. These studies have also shown that for the same spawn both the prehatch and yolk-sac growth curves reach asymptotic limits independent of temperature. Other biological events (e.g., jaw development) occur at the same size for all temperatures.

The growth of post-yolk-sac larvae follows a curve of the same type and hence the posthatch growth trajectory may be represented by a two-stage curve. For starving larvae, the second stage shows a decline in size but maintains the same form, i.e., the rate of exponential decline decreases exponentially with time.

Approved by Center Director

"Seasonal migration of North Pacific albacore, Thunnus alalunga, into North American coastal waters, their distribution, relative abundance, and association with transition zone waters" by R. Michael Laurs and Ronald J. Lynn. For publication in the Fishery Bulletin, U.S.

EXTENDED JURISDICTION

Contract Authorized for Economic Study of Offshore
Fishery for Anchovy and Jack Mackerel

Mr. Earl R. Combs, Consultant in Economics and Planning and contractor for the study, "Evaluate the economics of an offshore fishery for anchovy and jack mackerel," was in La Jolla on October 18-19 to discuss the objectives and procedures in depth prior to detailing a study plan. Later Mr. Combs and Dr. Dan Huppert, Economist at the La Jolla Laboratory, traveled to Terminal Island to discuss the contract study with personnel at the Southwest Regional Office and the California Department of Fish and Game and to put together a list of industry representatives for future contacts.

In other activities at the Southwest Fisheries Center on extended jurisdiction, Dr. Gary Stauffer, Fishery Biologist at La Jolla, attended an MRC meeting in Long Beach on October 21 to answer questions on the trawl fishery Preliminary Management Plan that includes jack mackerel, and on the economic contract.

Dr. Stauffer also continued efforts for planning jack mackerel research with the objectives of describing the distribution of fishable concentrations of jack mackerel off the Pacific Coast, particularly off northern California, Oregon, and Washington, and determining the relationship of this northern portion of the jack mackerel population to that in southern California.

Dr. Stauffer, with the assistance of Dr. Paul Smith, is preparing a report on the census of hake larvae from the cruise of the Soviet research vessel, Poseydon, conducted in January and February 1976 for the meeting of U.S. and Soviets scientists in Seattle slated for November 30 to December 4. Dr. Stauffer will attend the meeting as the representative of the Southwest Fisheries Center.

HONOLULU LABORATORY

TUNA ASSESSMENT AND DEVELOPMENT INVESTIGATIONS

Agreement Nears on Plans for Cooperative Study
of the Northwestern Hawaiian Islands

The State of Hawaii, the U.S. Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service are developing plans for an intensive 5-year cooperative study to survey and assess the living resources of the Northwestern Hawaiian Islands (NWHI), which will include an investigation of the terrestrial, nearshore, slope, and pelagic resources of the area and their interrelationships. Dr. Robert Skillman of the Honolulu Laboratory is serving as coordinator for the study.

The Hawaii Division of Fish and Game and the USFWS submitted redrafts of the prospectus, "The Northwestern Hawaiian Islands, a proposal for survey and assessment of their living resources," which the Honolulu Laboratory had submitted for their review and comments. Dr. Skillman held discussions with representatives from each agency to go over their suggested changes and to work out remaining differences between the three participating agencies. As for the general goals of the study as well as the goals of the individual agencies, no serious differences remain; hence, a new prospectus will be written bringing together the views of the three agencies. Some problems are yet to be resolved with respect to jurisdiction over certain submerged lands. Dr. Skillman is quite hopeful that these problems will be resolved to the satisfaction of all the cooperating agencies.

Basic Plans for the Honolulu Laboratory's (HL) Assessment
Work in the Northwestern Hawaiian Islands Almost Complete

Mr. Richard Uchida, Acting Leader, and Mr. Thomas Hida, Fishery Biologist of the Insular Resources Task, Mr. Ray Sumida, Acting Data Manager, and Dr. Skillman met with Mr. Miles Alton, Northwest Fisheries Center (NWFC) to discuss HL's work in the NWHI. The discussion centered around the design of the sampling program, which must consider the topography of the area, the many islands and banks, the various sampling gears to be used, and the multitude of species occurring in the area.

In addition, a few days (October 12-17) of Townsend Cromwell cruise 76-06-73 were used for gear shakedown and refinement of trawling methods. Mr. Steven Hughes, Fishery Biologist from the NWFC was also on board to provide expertise and to discuss demersal sampling strategy with HL staff members. Dr. Skillman used these discussions as a basis to design a sampling plan for the collection of data that will yield biomass estimates of various fish resources taken with different gears in the NWHI. This plan will be further refined in the coming months.

In other aspects of the planning for the NWHI study, Mr. Uchida developed and finalized program proposals for FY-1977, completed the current year task plan and prepared position descriptions for new biological aids for the Insular Fishery Resources Task. He also prepared, with the aid of Computer Technician Sally Kuba, a background document on the NWHI.

Townsend Cromwell Departs for Northwestern Hawaiian Islands Cruise

The NOAA research vessel Townsend Cromwell departed Honolulu on October 18 to continue the second leg of Cruise 76-06-73 to the NWHI. The cruise objectives include assessment of the demersal fauna by bottom fish trawling, fish and lobster trapping, and handlining. Midwater sampling of forage organisms and oceanographic observations will also be done. The scientific field party on the cruise include Mr. Thomas Hida, Chief Scientist, Mr. Reginald Gooding, Fishery Biologist, and Mr. James Uchiyama, Mr. Paul Shiota, and Mr. Victor Honda, Research Assistants. Also on board are Mr. Augustine Barcott, Fishery Gear Maintenance Man, NMFS, NWFC, Mr. Michael J. Wilder, graduate student, University of Guam, and Mr. Mark Harrington, graduate student, University of Hawaii.

Dr. Louis Herman and Mr. Steve Sipman of the University of Hawaii will join the cruise at Midway Island on the homeward bound leg. They will be making observations on the humpback whale while on the Cromwell.

PEACESAT Session Discusses Pacific Skipjack Tuna Fisheries

Dr. Skillman attended a PEACESAT communications meeting at the University of Hawaii to discuss the subject of skipjack tuna management in the Pacific Ocean. People from Tonga, Noumea, Rarotonga, Honiara, Tarawa, Fiji, and Honolulu participated in the session. In addition to Dr. Skillman, the Honolulu participants were Dr. George Kent, Political Science Department, University of Hawaii; Dr. John Bardach, Hawaii Institute of Marine Biology, University of Hawaii; and Dr. Philip Helfrich, International Center for Living Aquatic Resources Management. The discussions consisted primarily of summaries of the skipjack tuna landings from existing fisheries and summaries of various skipjack tuna development activities. The subject of extended jurisdiction came up, and several people asked for a brief summary of the U.S. law. The summary prepared by the Southwest Regional Office has been sent to the participants. Extended jurisdiction by the various island states and its impact on skipjack tuna management will most likely be the topic for the next couple of monthly, 1-hour discussions using the PEACESAT satellite.

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Mr. Otsu received a visit from Mr. Ryoji Saito, Japan Marine Fishery Resources Development Center, Tokyo, who spent a few days in Honolulu en route home to Japan after spending 5 months on a skipjack tuna bait survey

project in the Trust Territory of the Pacific Islands. Mr. Saito met briefly with Mr. Otsu, Mr. Hida, and Research Assistant Thomas Kazama, to discuss bait problems. Mr. Otsu also met briefly with other visitors from Japan: Mr. S. Masuda and Mr. S. Shimura of the Federation of Japan Tuna Fisheries Co-operative Associations, and Mr. Yonezawa and Mr. Morimoto of the Japan Fisheries Agency, all of whom were en route home to Japan after attending the Inter-American Tropical Tuna Commission meetings in Nicaragua.

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Dr. Skillman, together with Fishery Biologist Jerry Wetherall, and Operations Research Analyst Roy Mendelssohn, attended the 27th Tuna Conference at Lake Arrowhead, California.

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Fishery Biologist Walter Matsumoto has begun preparation of a paper on larval skipjack tuna studies in the Indian and Pacific Oceans to be presented at the forthcoming skipjack tuna meeting in Noumea, New Caledonia in December.

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Hawaiian Skipjack Tuna Landings From September 20 to October 24 Higher than Long-Term Average

The September 20-October 24 landings of skipjack tuna were estimated at 391.4 MT (metric tons), which is 176.1 MT above the 1975 landings for the same period and 29.4 MT above the 1948-75 long-term average. The cumulative landings from January through October 24 were estimated at 3,329.5 MT, which is 1,241.4 MT above last year's landings for the same period but still 353.3 MT below the average cumulative landings for the same period in 1948-75.

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FISH-ENVIRONMENT INVESTIGATIONS

Yellowfin Tuna Chemosensory Experiments to be Completed Soon

Research Assistant Walter Ikehara of the University of Hawaii and Dr. Jelle Atema of Woods Hole Marine Biological Laboratory report that all but a few tests conducted at Kewalo Basin on the yellowfin tuna chemosensory project have been completed and analyzed. To date, 104 tests have been run, with 18 different extracts or derivatives.

The stock nehu, Stolephorus purpureus, rinse has diminished slightly in effectiveness while a rinse made from fresh frozen white bait, Osmerus sp., has proven to be very effective. It is quite possible that the fish have been conditioned to the smell of their primary food item.

Separation of the devolatilized portion of the stock nehu rinse by protonated column has yielded two fractions, one containing mainly amino acids and amines and the other containing the remainder that passed through the column, which probably included long chain lipids, polysaccharides, and uncharged particles. Both fractions were shown to be active, but a slight edge was indicated by the remainder fraction.

The various amino acids in the fraction were tested in concert and separately to elicit responses from the fish. In blind tests by the experimenters, the results show that the mixture of all amino acids is more effective than either of two mixtures minus tryptophan and kynurenine, respectively. Blind ratings based on the analyses of the tests correlated exactly with the expected ratings for the mixtures which vindicates the analytical methods used by the experimental team.

However, none of the mixtures produced anything more than a weak response as compared to the strong responses to the stock nehu and white bait rinses. The composition of the stimulus seems to be more complex than originally thought.

Recent tests with porpoise feces suspensions have not supported the earlier tests of these substances. The overall response seems to be quite weak. Association with porpoise schools by olfactory cues may be a learned response in the adult yellowfin tuna of the eastern Pacific.

The control tests with plain sea water have consistently yielded no results. The squid extract does not seem to be very stimulatory, whereas most of the fish based extracts have been, at least, weakly stimulatory.

Observations Made on Body Temperature, in Relation to Water Temperature, and Activity of Tunas

Dr. Andrew Dizon, Leader of the Experimental Ecology of Tunas Task at Honolulu reported that data from 10 fish monitored for body temperature changes while they were swimming in a controlled temperature environment (20°, 25°, and 30°C) have yielded some interesting results. There does indeed seem to be a temperature effect upon swimming speed. As temperature increased so did swim speed, but only slightly. At 20°C, swim speed averaged about 1.4 lengths/sec and at 30°C it had increased to about 1.7 lengths/sec. Perhaps of more interest is that body temperature seemed independent of lap swimming speed. In one case, body temperature remained constant over the three test temperatures. With most fish, however, body temperature was significantly, but seemingly arbitrarily, higher at one test temperature but was not correlated with speed of lap swimming. It is suspected that non-lap

swimming (reversals), which was excluded from the initial analysis, seemed to generate more body heat than just faster lap swimming and therefore must be responsible for this phenomena. White muscle temperatures were also examined; in both fish tested; temperature remained constant at 1.4°C above ambient.

Construction of Respirometer Held in Abeyance

Due to the very large expense and the uncertainties of both the mechanical and biological aspects of a closed-circuit Brett-style respirometer, Dr. A. Dizon and his staff have decided to reconsider the immediate construction of the facility. A one-time, flow-through swimming tube is currently being built to test fish handling techniques and to get some idea of maximum sustained swimming speed of test fish before funds are committed for the respirometer. The large oceanarium (33,000 gal) will be used as a reservoir to feed an 8-inch diameter polyvinyl chloride test chamber. Swim velocities up to about 10 lengths/sec. can be provided. Construction of the device will utilize principles to develop laminar flow outlined in several design papers from Dr. Brett's laboratory. If the fish will tolerate the chamber, it is intended to test (1) maximum sustained swim speed, (2) involvement of red and white muscle at different swim speeds, (3) heat loss rate and, if cannulation techniques are successful, (4) respiration and lactate production.

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Dr. Richard Barkley, Chief, FEI, reviewed the DOMES (Deep Ocean Mining Environmental Study) documents for the Director's Office and prepared an evaluation of the program plus a plan for HL action. He also met with Dr. George Anderson of the University of Washington to discuss DOMES.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

ALBACORE FISHERIES PROGRAM

Analysis of Albacore Data in Progress

Dr. Michael Laurs, Leader of the Albacore Fisheries program at the La Jolla Laboratory, reports that the analysis of albacore catch data and oceanographic data for the early-season offshore albacore survey conducted cooperatively with fishing vessels on charter to the American Fishermen's Research Foundation was completed. Oceanographer Ron Lynn completed a draft of the report on the offshore work. Presently the staff is working to complete the analysis of the in-season cooperative survey data.

Analysis of the ocean frontal studies on the albacore oceanography cruise conducted on the Jordan has been delayed until the salinity-temperature-depth data are processed by Scripps Institution of Oceanography. A preliminary listing was available at the end of the month. Two of the field magnetic data tapes turned out to be blank for yet unknown reasons. Personnel of the Inter-American Tropical Tuna Commission who participated in the Jordan cruise are developing programming to operate an automatic digitizer to reduce the STD analog traces to magnetic tape for computer processing.

Albacore-catch effort data for 1971 have been standardized into time/area strata and entered into the albacore data file by Mr. T. Mulitauaopele, Fishery Biologist at the La Jolla Laboratory. This action completes a series of albacore/nominal catch per unit of effort by time/area strata from 1961 through 1975. This study is being conducted in cooperation with scientists from the California Department of Fish and Game, Oregon Department of Fish and Wildlife and Washington State Department of Fisheries.

* * * * *

Mr. Lynn attended the NORPAX workshop in Seattle October 20 and 21 where principal investigators from NORPAX reviewed their projects. Several of the projects complement work in progress at the Center, including a broad-scale survey in the central North Pacific which borders the ocean frontal studies, a drifter buoy study which inspired the Center's drifter buoy project and heat budget studies which are based on the marine deck assembled at the Center.

STOCK AND RECRUITMENT PROGRAM

Feasibility Study of Techniques for Determining Age of Priority Rockfish Species Started

Rockfishes, Scorpaenidae, constitute one of the largest families inhabiting marine waters of California and are of major importance to both commercial and sport fisheries.

At the La Jolla Laboratory, rockfish research is focused on the assessment of southern California stocks to evaluate the impact of exploitation, both commercial and recreational, on these multi-species group of fishes.

Aging capability is fundamental to rockfish research and Mr. John MacGregor, Fishery Biologist, has begun a feasibility study of techniques for aging the priority rockfish species. According to Mr. MacGregor, age composition could indicate exploitation levels, either by a decreasing age composition or by increased growth rates.

In October, Mr. MacGregor reported that his efforts were directed to reading the scales of the bocaccio, Sebastes paucispinis, and the chili-pepper, Sebastes goodei, because these two rockfish species can be compared with an earlier age study based on scales. Some comparative work has been done with otoliths and scales from the same fish. The only conclusions thus far is that neither otoliths nor scales are easy to read. However, length at age from scale readings compare fairly well with earlier work on these two species. Further work is still needed to establish criteria for annuli in both scales and otoliths.

Fishery Biologist Tina Echeverria of the Tiburon Laboratory who is working on Sebastes (Sebastes) aging at the Tiburon Laboratory, visited the La Jolla Laboratory on October 26; Miss Echeverria brought scales of the green spotted rockfish, S. chlorostictus to compare with those collected off southern California.

Histological Criteria Established for Diagnosis of Extent of Starvation in Jack Mackerel Larvae

To determine the sources of mortality of larval fishes, a method for the diagnosis of starvation in field-caught specimens is essential. Fishery Biologist Gail Theilacker of the La Jolla Laboratory has recently completed a paper which evaluates morphological and histological criteria for the diagnosis of starvation in jack mackerel larvae.

Various histological and morphological measurements were made of fed and starved jack mackerel larvae reared in the laboratory. Ms. Theilacker found that body depth measured at the pectoral fin was a good indicator of starvation. Statistical differences existed between starved and fed larvae in all length classes considered.

It was also found that many histological features were indicative of starvation. Change in the cellular arrangement in the pancreas and the gut were noticeable even after one day of starvation and these two characteristics were used to establish histological criteria for diagnosis of the extent of starvation.

Some Aspects of the Early Life History of Pacific Mackerel Larvae Delineated

Fishery Biologist John Hunter, assisted by Carol Sanchez, Biological Technician at the La Jolla Laboratory, have now determined incubation time, rate on survival and growth and food size requirements for Pacific mackerel larvae, Scomber japonicus. Dr. Hunter and Ms. Sanchez found that the incubation period of mackerel eggs varies from 33 hours at 23°C to 117 hours at 14°C. At hatching, larvae are 3.1 mm long and weigh 0.39 mg of which 58% is yolk. Fifty hours after hatching, 50% of the larvae are capable of feeding at which time larvae were 3.6 mm long and only 10% of the yolk remained. At this time, they must find food within 56 hours to survive, whereas,

at metamorphosis, mackerel were able to withstand starvation for about five days. Larvae metamorphose 2 to 3 weeks after hatching at which time they are 15 mm and weigh 7.5 mg.

To survive and grow, mackerel larvae must feed on progressively larger prey. Typically, mackerel larvae were unable to capture prey that had a width greater than 70 to 80% of the width of the mouth. Cannibalism began when the mean length of fish in a rearing group was 8 mm and persisted until metamorphosis and the onset of schooling.

Project Started to Determine Spawning Frequency in Anchovies

Mr. R. Leong of the La Jolla Laboratory has initiated a new project which will use laboratory methods to examine the problems of spawning frequency in anchovies. The number of times that an anchovy spawns during a year's time is a statistic that is used in calculating the spawning biomass from egg census data. Preliminary work has been started to determine the proper experimental tank size and to develop procedures for sexing anchovies and observing the level of maturation without seriously injuring the fish.

Thus far, a 10-foot diameter tank, 2 feet deep, appears to be the smallest practical size for maintaining anchovies without unduly high mortality. A smaller size tank is desirable because more experimental units can be maintained and greater flexibility achieved. Whether or not the fish will mature and spawn in the 10-foot tanks remains to be seen. Four 10-foot tanks with photoperiod and water temperature controls have been set up for further testing.

Initial microscopic observations indicate that the urogenital papilla of the male anchovy is generally larger than that of the female, and the sexes can be distinguished from one another approximately 80% of the time. The more positive method of inserting a catheter to the gonad for a biopsy sample appears feasible but thus far mortalities have been unacceptably high. More work is being done to refine the microscopic technique.

* * * * *

During October, Mr. J. Brown, Electronic Technician at the La Jolla Laboratory, continued the assembly and operational testing of the Z-80 microprocessor-based development system. This system will be used to construct the dedicated computer module for an in situ free-fall particle counter which he is also building and will also later be used to process the particle data. A high-speed, forward and reverse write and search cassette magnetic tape recorder has been ordered for evaluation, with a read-after-write option. Currently, Mr. Brown is testing hardware as well as familiarizing himself with the unique instruction set and programming characteristics of the Z-80 central processing unit. The in situ particle counter is intended for the rapid delineation of particle size with depth; this is part of Dr. Lasker's continuing study of the distribution of larval fish food organisms.

ECOLOGY OF THE CALIFORNIA CURRENT

Logistic Growth Model Described for Northern Anchovy

California Department of Fish and Game biologist Alec MacCall stationed at the Southwest Fisheries Center in La Jolla in a cooperative State/Federal program is preparing a paper describing the logistic growth model for the northern anchovy, Engraulis mordax. Included in the paper is a method he derived to account for the effect of actual anchovy catches which were made during the period when logistic growth is assumed to have occurred (1951-72).

The logistic growth equation was solved to give an algorithm which predicts the population size after one year's growth, given initial population size. With this algorithm, actual catches can be subtracted from predicted population sizes, and the predicted growth curve can be solved sequentially. For various sets of trial growth parameters, the sum of squares of the deviations is calculated. The best estimate of the growth parameter value is then obtained by searching the response surface for the set of parameters giving the least sum of squares of deviations.

MARINE ENVIRONMENTAL ASSESSMENT

Recently Published Paper on Stromateoid Fishes Favorably Received

The publication by E.H. Ahlstrom, J. L. Butler and B.Y. Sumida titled, "Pelagic stromateoid fishes (Pisces, perciformes) of the eastern Pacific; kinds, distributions and early life histories and observations on five of these from the Northwest Atlantic" which appeared in Bull. Mar. Science Vol 26(3): 285-402, has elicited a greater response for reprints than any other recent contribution of this group. The chairman of the department of biology at an eastern university recently wrote, "I find some of the illustrations so beautiful that I would like to have one of the originals to be framed and hung in our department as an example of superior illustrations." Illustrations were made by Henry Orr and Barbara Sumida.

Work continued on several projects including work on flatfish larvae, neuston net collections made on extended cruise 7210, trawl collections made on extended cruises of the David Starr Jordan 7205 and 7210, and on life histories of rockfishes.

Dr. Elbert H. Ahlstrom, Leader of the Marine Environmental Assessment program, reported that his group is trying to reduce markedly the backlog of CalCOFI samples that were obtained on CalCOFI cruises made in 1972 and 1975. All staff members in the program are presently spending at least part time on identifying eggs and larvae from these CalCOFI collections.

Oceanic Fisheries Resources Division

PORPOISE/TUNA PROGRAM

Porpoise Behavior Cruise in Progress

An effort to learn more about the behavior of porpoises, particularly in relation to their close association with yellowfin tuna in the eastern tropical Pacific began on October 5 when the NOAA research vessel, David Starr Jordan, left San Diego to work with the NOAA chartered purse seiner, Elizabeth C.J. off Clipperton Island in a cooperative study with Dr. Kenneth Norris, UC Santa Cruz, under contract to the Marine Mammal Commission.

Scientific personnel from the Jordan will be transferred to the purse seiner each day, weather permitting. Observations on the behavior of tuna and porpoise schools will be made from the air, from the seiner, and underwater. Behavior data will be recorded on film and observed by the scientists.

According to the Chief NMFS scientist, Dr. William Perrin, during a standard data collection set, tuna/porpoise behavior will be recorded for about one hour before the chase begins. Observations will continue through the chase and the resulting set, and will continue for about one hour after the porpoise are carefully backed out of the seine.

Attempts will be made to mark animals in two schools with streamer tags and radio tags. When the school has been captured, up to 100 animals may be tagged with color-coded streamer tags and four to five animals will be equipped with radio transmitters. Some of the tagged animals will be measured and injected with the antibiotic, tetracycline in the hope that recaptures in the future will allow determination of dental layering patterns as an indication of age. The tagged schools will be traced by the Jordan, and the seiner will make two more sets on the same school if possible. Upon completion of the behavior sets another porpoise school will be captured and equipped with radio tags. The Jordan will follow these animals until it returns to San Diego in early December.

Extensive studies with gear will be conducted concurrently with the behavior studies and will continue after the behavior work is completed. Some new gear used in tuna fishing, particularly some modification of the purse seine itself, will be studied and tested to determine whether more porpoises can be saved with changes in the equipment.

Dr. Ken Norris, of the University of California, Santa Cruz, one of the world's experts on porpoise behavior, will lead the scientific team conducting the behavioral work. Dr. Norris will be aided by his associate, Dr. Warren Stuntz, also of UC, Santa Cruz. James Coe, of the La Jolla Laboratory, is in charge of gear work on the seiner.

* * * * *

The NOAA research vessel, Surveyor, has been made available to the Porpoise/Tuna Interaction program, for 23 days beginning on November 10, 1976, according to Mr. John Everett, in charge of the program at the La Jolla Laboratory. The Surveyor will be used to collect "ground truth" data on the sightings made by observers aboard research vessels. To accomplish this, observers and photographic equipment aboard the helicopter on the Surveyor, will gather independent information on the size and species composition of schools sighted by the research vessel.

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Mr. John Everett, Manager of the Porpoise/Tuna program at the La Jolla Laboratory, presented a talk on "Porpoise/Tuna interaction - technology-based problems and solutions" at the Second International Marine Technology Assessment Conference, held at Texas A&M University, October 5-8. Theme of the conference was "Energy, Food and the Oceans," and the gathering was jointly sponsored by the International Society for Technology Assessment, the European Oceanic Association, and Sea Grant/Center for Marine Resources of Texas A&M University.

In addition to discussing the past, present, and planned work in reducing mortality which focuses on fishing gear technology, Mr. Everett also talked about advanced technological techniques being investigated or developed to assist traditional methods in determining the ages of porpoise through chemical analyses of teeth, to assess their populations through aerial surveys and satellite-borne radar, and to determine migrations through satellite-link transmitter positioning. In addition a highly automated data base and excellent computer facilities allows operations research and statistical analysis techniques to be used to explore causes of and solutions to various portions of the problem.

TUNA RESOURCES PROGRAM

Documents for ICCAT Meeting Completed

Dr. Gary Sakagawa, Leader of the Tuna Resources Program at the La Jolla Laboratory, reports that staff members completed three documents during the month. The documents are the last of a set of 10 that will be presented at the upcoming meeting of the Standing Committee on Research and Statistics of the International Commission for the Conservation of Atlantic Tunas (ICCAT) in Madrid, Spain.

The titles of the documents are:

"State of the skipjack tuna stocks of the Atlantic Ocean from prediction model analysis, 1969-1975," by G. T. Sakagawa and A. L. Coan.

"Remote sensing: With application to the exploitation and management of Atlantic tuna stocks," by R. H. Evans.

"Review of United States fisheries and research activities on tuna and tuna-like fishes of the Atlantic Ocean for 1975-76," by NMFS.

Tuna Vessels Participate in Fisheries Service FAX Program

During October, 17 U.S. tropical tuna vessels participated in the FAX program of the La Jolla Laboratory.

	<u>Weather Observations</u>	<u>XBT Observations</u>	<u>Total</u>	<u>Total year to date</u>
1975	340	55	395	3,204
1976	135	5	140	2,453
Percent change	-60.3	-90.9	-64.6	-24.3

The tuna seiner, Santa Rosa, again led all cooperating vessels in October with 23 weather observations sent to the Southwest Fisheries Center via radio station WWD at the University of California, San Diego. The Santa Rosa's reports comprised 16.4% of the total number sent in; congratulations are due to Captains Noah and John Gomes of the Santa Rosa who have contributed the largest number of observations during six of the 10 monthly periods in 1976. Their contributions of weather observations (288) comprises 11.7% of all observations radioed to WWD thus far in 1976 by cooperating purse seiners.

During October, Dr. Glenn Flittner, Chief, Ocean Services, National Weather Service (formerly on the staff of the La Jolla Laboratory) and Dr. Hazen Bedke, Director, Western Region, National Weather Service visited the La Jolla Laboratory to confer with members of the staff of the Real-Time Fisheries Systems (RIFS) on problems concerned with the acquisition and handling of synoptic marine data and on recent comments by fishermen concerning the quality of facsimile products made available to purse seiners by the National Weather Service.

Flotsam and Tuna, 1963-1975

Tuna fishermen in the eastern tropical Pacific usually fish in one of three modes; on porpoise, on schoolfish, or on floating objects (flotsam). Yield per set is consistently highest on floating objects. With this fact in mind, Mr. Paul Greenblatt, a Scripps Institution of Oceanography graduate student, under the supervision of Dr. Gary Sakagawa, Leader of the Tuna Resources program at the La Jolla Laboratory, started examining a 13-year catch record of tuna associated with flotsam inside the Commission Yellowfin Regulatory Area to see what trends were present.

Preliminary findings have been striking. The number of sets associated with flotsam has increased dramatically and the catch per set has more than doubled in the 13-year period. Questions presently being explored are why the catch per set has increased so dramatically, and what connection there is between the availability of floating objects and the amount of tuna caught on them. By examining Inter-American Tropical Tuna Commission-summarized data, it is hoped that ways to exploit more fully the connection between tuna fish and flotsam can be developed.

TIBURON LABORATORY

PHYSIOLOGY INVESTIGATIONS

Apparatus Successfully Tested to Saturate Sea Water with Water-Soluble Fraction of Crude Oil

Mr. Tom Yocom, Fishery Biologist at Tiburon, reported continued work this month to develop an apparatus to saturate sea water with the water-soluble fraction (WSF) of Cook Inlet crude oil. The latest design was successfully tested in October. The apparatus produces a stable WSF in sea water, as did previous models, but allows continuous (and counter-current) replenishment of crude oil, thus eliminating the problems of having highly soluble components of the WSF stripped from the oil. By continuously replenishing the crude oil, the concentration of WSF in sea water passing through the apparatus can, theoretically, be held constant for extended periods of time.

Some starry flounder were exposed to the WSF in preliminary experiments. Fish in test aquaria were observed continuously as WSF-containing sea water was introduced. As the concentration (as estimated by UV-spectrometry) gradually increased in the test tanks, the respiration rate of flounder gradually increased. When the concentration in the tank was

approximately 40% of the inflowing concentration (4 hours after the start of the experiment) the fish lost equilibrium and ceased movement. These results indicate that the solubilizing apparatus produces a concentration of WSF far in excess of the 96-hour LC 50 for starry flounder. One solubilizing apparatus, therefore, should produce an adequate supply of WSF to continuously feed many test aquaria at chronic concentrations.

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Dr. Maurice Stansby, former director of the Environmental Conservation Division at the NMFC, visited the laboratory October 19 to discuss the oil research program and inspect the solubilization apparatus. Dr. Fred Weiss of Shell Oil Co. also visited the laboratory this month.

Striped Bass Task: October's Odyssey

Dr. Jeannette Whipple, Chief, Physiology Investigations at the Tiburon Laboratory, reports that work continued on embryonic and larval specimens of striped bass preserved during last year's spawning season. Larvae fed different concentrations and types of food organisms are being measured for growth and development. Their yolk and oil droplet consumption rates are being measured and caloric content estimated through microbomb calorimetry. The oil droplet appears to play an important role in the bioenergetics of the striped bass larvae. The oil has been isolated and its caloric content found to be very high (9222 cal/g). Presently the researchers are determining the relative oil content by weight and by volume in newly fertilized eggs.

Dr. Whipple has taken steps to hire four, part-time employees who will assist the project in the culturing of phytoplankton and zooplankton, and in the processing of samples from last spawning season's experiments.

COASTAL FISHERIES INVESTIGATIONS

King Salmon Substituted for Coho for Fall Pen-Rearing at Tiburon Laboratory

Twenty-thousand young king salmon were located at California Fish & Game's Feather River Hatchery after it was learned that the Mad River coho salmon would not be of sufficient size until next year. No other cohos could be located in the Pacific Northwest. The kings were delivered to the Tiburon Laboratory October 1. The fish weighed out at 13.5 fish per pound and are of fairly uniform size. Feeding rate and survival indicate good health. The costs of rearing these fish are being born by the San Francisco Tyee Club, a group of sportfishermen cooperating in the salmon project.

The substitution of king salmon for silver presents an opportunity to test the feasibility of pen rearing and to observe the resulting modification of return patterns of king salmon for the first time in California according to Mr. Roger Green, Leader, Recreational Fisheries Improvement Task. There is a run of king salmon in the Sacramento and San Joaquin Rivers from natural spawning and artificial propagation upstream, but the availability of these fish to anglers as they pass through San Francisco Bay is brief and erratic. If the pen-reared kings behave as do the cohos thus far returning to and remaining around the pen site over a period of several months each year--then there would appear to be another possibility for improving recreational fisheries.

This year tag returns of coho salmon total 93. Sixty-three of these were from last fall's release and 30 from this spring's release. Recreational angling for these fish has been good and they have been highly visible, jumping in great numbers over the past two months, concentrated within a 2-mile radius off the Tiburon Laboratory.

A gill net, measuring 100 ft. by 6 ft. deep, of 4-4 1/2" stretched mesh monofilament has been set two nights per week since August. To date, 144 cohos have been gill netted. Fourteen of these bore tags and 24 of the total were females. Mean weight of the fish was 1.72 kg.

The lopsided male to female ratio could be attributed to either 1) a run of jack salmon, i.e., sexually precocious fish which ordinarily run a year early and are predominantly males, or 2) an artifact of size grading. Before the smolts were delivered for our fall 1975 rearing, they were graded several times, at the hatchery, and larger-sized fish removed. These larger fish may have been mostly females. Gill net catches next year should help answer this question.

The ratio of tagged fish to total caught is much lower than the ratio at time of release, indicating tag shedding and tagging mortality. Also, the size of the tagged fish averages 1.39 kg, much smaller than total average. An attempt will be made to estimate these tag losses. The problem is complicated in that 3 groups of fish are involved: 1) the fall 1975 release of 30,000 fish, 7,000 of which were tagged; 2) coho salmon from Sea Grant's Tomales Bay pen-rearing project in the fall 1975 (they released 8,000 fish with 4,000 tags); and 3) the Tiburon Laboratory release of 6,000 fish in the spring of 1976, 5,000 of which were tagged.

Printing Costs of Anglers Guide to the Pacific Coast Less than Estimated

During the month, page proofs of the Angler's Guide were corrected by authors Jim Squire at La Jolla and Susan Smith at Tiburon. The corrected proofs were returned to the Scientific Publications Staff in Seattle.

Also during the month, it was learned that the printing cost of the Guide will be less than half that originally estimated by the Government Printing Office, mainly because the total number of pages, after laying out the book, was much less than expected. The original quote by GPO was around \$30,000 and the price is now down to approximately \$12,600.

The Anglers' Guide describes marine game fish, fishing grounds and angler facilities along the coasts of California, Oregon, Washington, Alaska, Hawaii, American Samoa and Guam.

COASTAL FISH COMMUNITIES INVESTIGATIONS

Data Analyzed for Design of Coastwide Rockfish Survey

Messrs. Peter Adams and William Lenarz at Tiburon have concentrated their efforts on analysis of bottom trawl data obtained from the Monterey Pilot Rockfish Survey which was conducted by the NMFS Northwest Fisheries Center. Results of the analysis will be used in the design of the coastwide rockfish survey scheduled for 1977. Twenty-four species of rockfish were collected. Sebastes jordani, short belly rockfish, was by far the dominant species in weight in trawls between 50 and 100 fathoms. S. diploproa, the splitnose rockfish, was by far the dominant species in trawls between 150 and 250 fathoms. These two species represented about 70% of the catch of rockfish. S. goodei (chilipepper) and S. paucispinis (bocaccio), represented only about 10% of the catch, even though these two species dominate the commercial landings of rockfish in the Monterey area. It is interesting to note that a study on rockfish larvae by Dr. Geoff Moser of the La Jolla Laboratory indicated that S. jordani would be a very important species. S. diploproa was not included in Dr. Moser's study.

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Ms. Tina Echeverria, Fishery Biologist, joined the Rockfish Task at Tiburon on October 1. Her initial duties have been to become familiar with the numerous species of rockfish of the Pacific Coast, and to learn the techniques of determining age from scales and otoliths and of measuring morphometrics of rockfish.

Inshore Marine Habitats on Mendocino Coast Surveyed

This month Dr. Edmund Hobson, Project Leader, and Fishery Biologist Tony Chess, began defining the inshore habitats at their northern California study site at Albion, Mendocino County. The southern California nearshore environment site of previous studies was protected from the North Pacific Seas by the configuration of the coast and the offshore islands; furthermore, there was little runoff with accompanying suspended sediment from coastal rivers. In contrast, the Mendocino coast is regularly buffeted by heavy seas, and seasonally suspended sediment in runoff from coastal rivers is heavy. The impact of these influences on the nearshore environment is being considered in defining the northern California habitats as points of comparison with the southern California studies.

PACIFIC ENVIRONMENTAL GROUP

OCEAN CLIMATOLOGY AND MONITORING

Computer Programs Developed for Mapping
of Sea Surface Temperatures

Dr. Douglas McLain, Oceanographer at the PEG, has continued development of computer programs mapping sea surface temperature and its anomalies. He has been working with Mr. Roger Bauer of Compass Systems, Inc. on interfacing sea surface temperature mapping programs used at PEG with a contouring program developed by Mr. Bauer and Ms. Margaret Robinson for mapping subsurface temperature. The objective of this work is to develop global, digital fields of ocean temperatures by month and by 1 degree squares. Such fields will be used to describe ocean fluctuations for the Status of the Environment Report in support of fisheries research. The data will also be used by Drs. Namias and Barnett at Scripps in a long range weather prediction model. Dr. McLain will meet next month with representatives from NOAA Environmental Data Services on potential use of the programs in a World Meteorological Organization program on historical trends of sea surface temperature.

Ship of Opportunity Program Faces
Budget Reduction

Stationed in Tiburon, California, Mr. Paul Sund, Oceanographer with PEG, serves as NMFS Coordinator of Platforms of Opportunity programs. During October 20-22, he attended the NORPAX co-principal investigators meeting in Seattle where he represented the NMFS/IDOE XBT Ship of Opportunity program. Mr. Sund discussed potential XBT sampling programs in the Equatorial Pacific with Dr. Klaus Wyrtki of the University of Hawaii and with other NORPAX investigators.

While in Seattle, Mr. Sund visited the Sea Use Council and NMFS Marine Mammal Laboratory to discuss XBT observations from platforms of opportunity and surveys of the distribution of marine mammals. Mr. Sund has been actively involved in aircraft surveys of marine mammals and in mammal sightings programs from merchant ships, fishing vessels, and from ferries of the Alaska State Ferry system.

Mr. Sund spent considerable time this month responding to instructions from NSF/IDOE with regard to budget reduction in the XBT ship of opportunity program for the upcoming year. The project will be reduced to XBT observations between San Francisco and Honolulu only.

OCEAN MODELING AND FORECASTING

Relative Importance of Environmental Variation and Fishery Intensity Influencing Decline of Pacific Sardine Fishery Studied

Mr. Richard Parrish, Fishery Biologist at PEG, has been studying the population dynamics over the last 50 years of the Pacific mackerel and Pacific sardine along the California coast.

Mr. Parrish received newly developed cohort analyses of the Pacific sardine from Mr. Alec MacCall of the California Department of Fish and Game for the period 1945-1965 (Mr. MacCall is presently stationed at the Southwest Fisheries Center). He will use these population estimates and earlier published estimates for the period 1932-1945 in conjunction with long term environmental data to assess the relative importance of environmental variation and fishing intensity in the decline of the Pacific sardine fishery.

* * * * *

Mr. David M. Husby, Oceanographer, completed the first draft of a paper entitled, "Fourier analysis of subsurface oceanographic time series - a numerical smoothing and analysis technique." This technique was used to summarize oceanographic data from Ocean Weather Station - VICTOR as part of air/sea interaction studies in the northwestern Pacific Ocean. Such studies will lead to understanding of how atmospheric fluctuations affect ocean circulation and structure and ultimately affect populations of marine organisms.

Dynamics of California Current & Coastal Upwelling Subject of Long-Term Study

Mr. Andrew Bakun, Oceanographer, and Lt. Craig S. Nelson, NOAA Corps, have been studying the dynamics of the California Current and the upwelling along the coast. Mr. Bakun is now on educational leave at Oregon State University.

Lt. Nelson recently compiled a long time series of monthly mean pressure fields based on FNWC pressure data. The series extends from January 1946 through September 1976, and will be updated monthly. The pressure series serve as the data base for calculations of monthly, wind-induced transport. Indices of the surface Ekman transport and Ekman transport divergence computed from such data have recently been used successfully in correlations with abundance of Atlantic menhaden off the coast of Virginia, dungeness crab off Oregon and Pacific mackerel off California. The time series will also be useful in studies of climatic shifts in upwelling, winds, and larval transport.

Time series of the longshore component of surface wind stress at several locations along the west coast of the United States have been provided by Lt. Nelson to Dr. John S. Allen, Oregon State University, who has derived a simple theory which related the integrated longshore wind stress to the north-south slope of sea level along the coast. The time series data will allow Dr. Allen to test this theory.

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Several PEG personnel have recently been involved in environmental impact assessment work. Mr. Gunter Seckel, Oceanographer, reviewed environmental impact statements for a National Petroleum Reserve for the NOAA Office of Ecology. Mr. Husby and Lt. Craig Nelson, participated in a meeting at San Francisco State University regarding research required for assessments of impacts of proposed petroleum development along the California coast.

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Pacific Environmental Group Chief Named
Regional Fisheries Attache

Mr. James H. Johnson, Oceanographer, resigned on October 9, 1976 as Chief, Pacific Environmental Group (PEG) to take a position with the NMFS Office of International Fisheries as Regional Fisheries Attache in Tokyo, Japan. Mr. Johnson will participate in negotiations with Japan, Korea and other Far East nations regarding various international fisheries issues. Included will be negotiations concerning the extension of the U.S. fisheries conservation zone to 200 nautical miles. Mr. Johnson will also assess the impact of the fisheries developments in far-Eastern nations on U.S. fisheries, develop policies for NMFS response to such developments, and maintain close liaison with the U.S. Department of State and various other government and industry groups.

Mr. Johnson transferred to Monterey from Washington, D.C. in August 1969 to take charge of the newly-formed Environmental and Fishery Forecasting Unit, in cooperation with the U.S. Navy's Fleet Numerical Weather Central (FNWC).

MEETINGS AND TRAVEL

October 1 - Mr. Izadore Barrett, Acting Director, SWFC; Adm. E. A. Taylor, Director, Pacific Marine Center (PMC), and Mr. Robert Hitz, PMC, met with Mr. Richard Shomura, Director, Honolulu Laboratory, to discuss Laboratory-Cromwell matters. Adm. Taylor and Mr. Hitz attended the Cromwell's precruise (76-06-73) meeting on October 4.

- October 6 - CalCOFI meeting held at Southwest Fisheries Center. Dr. Lasker and Mr. Barrett attended.
- 8 - Mr. Gerard Murphy, President, and Barbara Sunderland, Project Manager of Research Associates, met with Mr. Shomura, Mr. Heeny Yuen, and Dr. Wetherall to discuss the contract "Bio-economics and optimal management criteria for utilization of Pacific billfish." They discussed the proposal, initial action to get it going, and making contact with key people in promoting the billfish project.
- Mr. George H. Balazs, Marine Biologist from the Hawaii Institute of Marine Biology, visited Mr. Shomura to discuss his green sea turtle project and the possibility of NMFS funding for this project.
- 9-16 - Acting Center Director Izadore Barrett and Dr. William Fox, in Managua, Nicaragua, to attend the annual meeting of the Inter-American Tropical Tuna Commission and the Inter-Governmental Body.
- 11-13 - Dr. Reuben Lasker, Leader of the Coastal Fisheries Resources Division, attended a meeting of the National Science Foundation Biological Oceanography Panel meeting in Washington, D.C. to review research proposals for funding. Dr. Lasker has been a member of this panel since 1974.
- 12-14 - Mr. Sus Kato of the Tiburon Laboratory traveled to Southern California to deal with the shipment of gear used during the recent cruise on D.S. Jordan. Several fish traps were loaned to fishermen in San Diego who will experiment with their effectiveness in catching certain species. Gear borrowed from the California Dept. of Fish & Game was returned to San Pedro.
- 12-15 - Planning Officer David Mackett traveled to Seattle, Wash. to attend the first meeting of the Pacific Fishery Management Council meeting.
- 14 - Mr. Ronald Linsky, Director, Sea Grant Programs, University of Hawaii, met with Mr. Shomura to discuss Snug Harbor facilities.
- 15 - Mr. Shomura and Mrs. Mary Lynne Godfrey, Commerce Agency Head, Combined Federal Campaign, attended the CFC luncheon at Ala Moana Park Pavilion.
- 18-19 - Mr. David Mackett, Planning Officer, in Los Angeles to attend the Western Systems Conference.

- October 18-21 - Dr. Eric Barham, Fishery Biologist with the Porpoise/Tuna program, traveled to Bay St. Louis, Mississippi to analyze 9" aerial photographs taken of porpoise schools and to meet with NMFS Fisheries Engineering Laboratory personnel on photographic enhancement procedures for the preparatory aerial survey mission off Baja California. Subsequently, Dr. Barham went on to Boise, Idaho to meet with officials of the U.S. Department of Interior's Office of Aircraft Services on conditions and agreements of obtaining a P2V aircraft to conduct a major survey of porpoise populations in the eastern Pacific, now tentatively slated to take place about January-February 1977.
- 19-21 - Mr. Shomura attended the Western Pacific Fisheries Council meeting at the Pagoda Hotel.
- 21-26 - Tina Echeverria, Fishery Biologist at the Tiburon Laboratory, visited CF&G Long Beach, CA. to confer on aging rockfish. Conference with H.G. Moser at La Jolla on morphometrics of rockfish, and G. Stauffer on aging fish.
- 23 - Mr. Shomura departed Honolulu for Colombo, Sri Lanka to attend the Indo-Pacific Fisheries Council Symposium on the Development and Utilization of Inland Fishery Resources (October 27-29) and the IPFC 17th Session (November 1-5). Mr. Shomura served as Alternate U.S. Delegate at the 17th Session.
- 25-29 - Wally Giguere, Administrative Officer at the Tiburon Laboratory, attended Financial Management Conference, Seattle, Washington.
- 29-31 - Mr. Mackett in Bodega Bay, Ca. to attend a workshop of the California Committee on Marine Ecological Survey standards.
- 26-27 - Dr. Reuben Lasker was in Seattle, Washington to attend a meeting of the Ocean Science Board where he presented a brief report on federal responsibilities in ocean science, particularly science management in NOAA, the Coast Guard and ERDA.
- 26-30 - Dr. Michael Laurs, Acting Deputy Director of the Southwest Fisheries Center was in Miami, Florida to attend the NOAA Ocean Color Conference. This conference was a review of what the NIMBUS-G satellite can do for fisheries and oceanography. According to Dr. Laurs there is the possibility that the SWFC may use this satellite since it will be launched about the same time that CalCOFI is mounting a cruise to obtain ground truth data on fisheries resources of the California current.

October 29 -
November 1

- James R. Chess, Fishery Biologist, Tiburon Laboratory, attended meeting of California Committee on Marine Ecological Standards, Bodega Bay Marine Lab, Bodega Bay.

HONORS AND AWARDS

		<u>Laboratory</u>
October 22	- Peter Abbatello (Maintenance Mechanic) and Pete Bennville (Research Chemist) - Joint Incentive Award, \$660	Tiburon
26	- Alice Jellett (Clerk-Typist) - Special Achievement Award	Tiburon

VISITORS

La Jolla Laboratory

- October 4 - Dr. Glenn A. Flittner, National Weather Service, Silver Spring, Maryland.
- Mr. Bruce L. Wing, Northwest Fisheries Center, Auke Bay Fisheries Laboratory, Auke Bay, Alaska.
- 6 - Ms. Phyllis Altrogge, NMFS, Washington, D.C.
- 7 - Three university professors of oceanography and marine science from Iran--Dr. Mansour Niazi, Ferdowsi University; Dr. Fatemeh Moghadam, University of Tehran; and Dr. Faramarz Hosseini, Pahlavi University--visited the La Jolla Laboratory as part of a tour to various government, industry, and commercial private oceanographic companies in the U.S. The purpose of the tour is to familiarize the scientists with the status of oceanographic and marine science research in the U.S. The information thus gained will assist them in preparing recommendations for the Shah of Iran for the development of marine science programs in Iran.
- 25 - Ms. Tina Echeverria, NMFS, Tiburon, CA.
- 1-8 - Dr. Garth Murphy, CSIRO, Cronulla, Australia.

Honolulu Laboratory

- October 13 - Dr. Garth Murphy, CSIRO, Cronulla, Australia.
- 22 - Mr. Lorry Nakatsu, OES/OFA, Department of State, Washington, D.C.
- Mr. James Johnson, Regional Fisheries Attache for Tokyo.

Tiburon Laboratory

- October 6 - Thomas Cott, Verd-A-Ray Corp., San Rafael, CA.
- 7 - Pat Foster, SFSU, San Carlos, CA.
- 8 - K. Takayama, Western Concept, San Francisco, CA.
- 13 - Mill Fong, Angler Magazine
- Christine Fong, Angler Magazine
- Mrs. A. C. Beckett, San Jose State College Faculty Wives' Explorers Club, Campbell, CA.
- Dorothy M. Ellis, San Jose State Faculty Wives, Campbell, CA.
- 21 - Bill Detwiler & Joan Gallagher, SFSU, S.F.
- 28 - Judy Anaderio, George Hetzel - Bayside School, Sausalito, CA.
- 29 - Martin Baker, A. Daigger & Co.

PERSONNEL

Laboratory

- October 1 - Mark Mallinckrodt, Biological Technician - Termination La Jolla
- Michael Deerman, Biological Technician - Termination La Jolla
- 2 - Paul Greenblatt, Physical Scientist - Temporary Appointment La Jolla
- 4 - Victor Chow - Student Appointment La Jolla
- 10 - Kathleen Coleman, Secretary - Promotion La Jolla
- Tina Echeverria, Fishery Biologist - Promotion Tiburon
- 12 - Michael J. Wilder, Biological Aid - Temporary Appointment Honolulu
- 15 - Gordon Armstrong, Biological Technician - Termination La Jolla

Laboratory

October 19	- Eugene Tillerson, Statistical Assistant - Temporary Appointment	La Jolla
22	- Jo Medley, Secretary - Resignation	Tiburon
	- Stan Smith, Biological Technician - Termination	Tiburon
24	- Barbara Engstrand, Administrative Assistant - Promotion	La Jolla
	- Marleen DiBona, Administrative Clerk - Promotion	La Jolla
27	- Joyce Milhouse, Clerk-Stenographer - Separation/Transfer	La Jolla
	- Julie Dickson, Clerk-Stenographer - Career-Conditional Appointment	La Jolla
	- William Fox, Fishery Biologist - Promotion	La Jolla
29	- Michael J. Wilder, Biological Aid - Termination	Honolulu
	- Henry M. Kishinami, Biological Aid - Temporary Appointment	Honolulu

TRAINING

October 16-23 - Maureen Woods, Librarian - Federal Inter-
agency Field Librarians' Workshop, Alexandria,
Virginia

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